

**PUBLIC EMPLOYEES RETIREMENT ASSOCIATION OF MINNESOTA  
LOCAL GOVERNMENT CORRECTIONAL SERVICE  
RETIREMENT PLAN  
ACTUARIAL VALUATION REPORT AS OF JULY 1, 2015**



November 25, 2015

Public Employees Retirement Association of Minnesota  
Trustees of the Local Government Correctional Service Retirement Plan  
St. Paul, Minnesota

Dear Trustees of the Local Government Correctional Service Retirement Plan:

The results of the July 1, 2015 annual actuarial valuation of the Local Government Correctional Service Retirement Plan are presented in this report. This report was prepared at the request of the Board and is intended for use by the Board and staff and those designated or approved by the Board. This report may be provided to parties other than the Plan only in its entirety. GRS is not responsible for the consequences of any unauthorized use of this report.

The purpose of the valuation is to measure the Plan's funding progress and to determine the required contribution rate for the fiscal year beginning July 1, 2015. Note that we have not attempted to quantify the impact of GASB Statements No. 67 and No. 68 in this report.

The valuation was based upon information furnished by the Public Employees Retirement Association of Minnesota (PERA), concerning benefits, financial transactions, plan provisions and active members, terminated members, retirees and beneficiaries. We checked for internal and year-to-year consistency, but did not otherwise audit the data. We are not responsible for the accuracy or completeness of the information provided by PERA.

Actuarial assumptions, including discount rates, mortality tables and others identified in this report, are prescribed by Minnesota Statutes Section 356.215, the Legislative Commission on Pensions and Retirement (LCPR), and the Trustees. These parties are responsible for selecting the Plan's funding policy, actuarial valuation methods, asset valuation methods, and assumptions. The policies, methods and assumptions used in this valuation are those that have been so prescribed and are described in the Actuarial Basis of this report. PERA is solely responsible for communicating to GRS any changes required thereto.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law. Due to the limited scope of our assignment, we did not perform an analysis of the potential range of such future measurements.

Actuarial standards do not require the actuary to evaluate the ability of the plan sponsor or other contributing entity to make required contributions to the plan when due. Such an evaluation was not within the scope of this project and is not within the actuary's domain of expertise. Consequently, the actuary performed no such evaluation.

This report should not be relied on for any purpose other than the purpose described herein. Determinations of the financial results associated with the benefits described in this report in a manner other than the intended purpose may produce significantly different results.

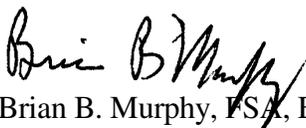
The signing actuaries are independent of the plan sponsor. We are not aware of any relationship that would impair the objectivity of our work.

Brian B. Murphy and Bonita J. Wurst are Members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein. In addition, Mr. Murphy meets the requirements of "approved actuary" under Minnesota Statutes Section 356.215, Subdivision 1, Paragraph (c).

This report has been prepared by actuaries who have substantial experience valuing public employee retirement systems. To the best of our knowledge and belief the information contained in this report is accurate and fairly presents the actuarial position of the Local Government Correctional Service Retirement Plan as of the valuation date and was performed in accordance with the requirements of Minnesota Statutes Section 356.215, and the requirements of the Standards for Actuarial Work established by the LCPR. All calculations have been made in conformity with generally accepted actuarial principles and practices, and with the Actuarial Standards of Practice issued by the Actuarial Standards Board and with applicable statutes.

We are available to answer any questions or provide further details.

Respectfully submitted,



Brian B. Murphy, FSA, EA, MAAA



Bonita J. Wurst, ASA, EA, MAAA

BBM/BJW:bd

## **Other Observations**

### **General Implications of Contribution Allocation Procedure or Funding Policy on Future Expected Plan Contributions and Funded Status**

Given the plan's contribution allocation procedure, if there are no changes in benefits or contributions and all actuarial assumptions are met (including the assumption of the plan earning 8.0% on the actuarial value of assets), it is expected that:

- (1) The unfunded actuarial accrued liabilities will be fully amortized after 16 years, and
- (2) The funded status of the plan will increase gradually towards a 100% funded ratio.

### **Limitations of Funded Status Measurements**

Unless otherwise indicated, a funded status measurement presented in this report is based upon the actuarial accrued liability and the actuarial value of assets. Unless otherwise indicated, with regard to any funded status measurements presented in this report:

- (1) The measurement is inappropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations, in other words of transferring the obligations to a unrelated third party in an arm's length market value type transaction.
- (2) The measurement is dependent upon the actuarial cost method which, in combination with the plan's amortization policy, affects the timing and amounts of future contributions. The amounts of future contributions will most certainly differ from those assumed in this report due to future actual experience differing from assumed experience based upon the actuarial assumptions. A funded status measurement in this report of 100% is not synonymous with no required future contributions. If the funded status were 100%, the plan would still require future normal cost contributions (i.e., contributions to cover the cost of the active membership accruing an additional year of service credit).
- (3) The measurement would produce a different result if the market value of assets were used instead of the actuarial value of assets, unless the market value of assets is used in the measurement.

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## Summary of Valuation Results

### Contributions

The following table summarizes important contribution information as described in the Development of Costs section.

<b>Contributions</b>	<b>Actuarial Valuation as of</b>	
	<b>July 1, 2015</b>	<b>July 1, 2014</b>
Statutory Contributions - Chapter 353E (% of Payroll)	14.58%	14.58%
Required Contributions - Chapter 356 (% of Payroll)	14.54%	13.49%
Sufficiency / (Deficiency)	0.04%	1.09%

The contribution sufficiency decreased from 1.09% of payroll to 0.04% of payroll. The primary reason for the decreased contribution sufficiency is the change in discount rate to 8%.

The Plan Assets section provides detail on the Plan Assets used for the valuation including a development of the actuarial value of assets (AVA). The market value of assets (MVA) earned approximately 4.4% for the plan year ending June 30, 2015. The AVA earned approximately 11.5% for the plan year ending June 30, 2015 as compared to the assumed rate of 8.0%. The assumed rate is mandated by Minnesota Statutes.

Participant reconciliation and statistics are detailed in the Membership Data section. The Actuarial Basis section includes a summary of plan provisions and actuarial methods and assumptions used for the calculations in this report.

Accounting information prepared according to Statements No. 67 and No. 68 will be provided in a separate report.

## Summary of Valuation Results

A summary of principal valuation results from the current valuation and the prior valuation follows. Any changes in plan provisions, actuarial assumptions or valuation methods and procedures between the two valuations are described after the summary.

	<b>Actuarial Valuation as of</b>	
	<b>July 1, 2015</b>	<b>July 1, 2014</b>
<b>Contributions</b> ( <i>% of Payroll</i> )		
Statutory - Chapter 353E	14.58%	14.58%
Required - Chapter 356	14.54%	13.49%
Sufficiency / (Deficiency)	0.04%	1.09%
<b>Funding Ratios</b> ( <i>dollars in thousands</i> )		
Assets		
- Current assets (AVA)	\$ 475,963	\$ 410,489
- Current assets (MVA)	490,731	453,232
Accrued Benefit Funding Ratio		
- Current benefit obligations	\$ 454,600	\$ 386,664
- Funding ratio (AVA)	104.70%	106.16%
- Funding ratio (MVA)	107.95%	117.22%
Accrued Liability Funding Ratio		
- Actuarial accrued liability	\$ 498,052	\$ 426,508
- Funding ratio (AVA)	95.56%	96.24%
- Funding ratio (MVA)	98.53%	106.27%
Projected Benefit Funding Ratio		
- Current and expected future assets	\$ 688,060	\$ 620,398
- Current and expected future benefit obligations	687,276	597,012
- Projected benefit funding ratio (AVA)	100.11%	103.92%
<b>Participant Data</b>		
Active members		
- Number	3,692	3,603
- Projected annual earnings ( <i>000s</i> )	189,838	182,353
- Average projected annual earnings	51,419	50,611
- Average age	39.8	40.3
- Average service	7.5	7.7
Service retirements	655	571
Survivors	40	36
Disability retirements	169	162
Deferred retirements	2,620	2,380
Terminated other non-vested	2,139	1,936
<b>Total</b>	<b>9,315</b>	<b>8,688</b>

## Summary of Valuation Results

### Effects of Changes

The following changes in plan provisions, actuarial assumptions, and methods were recognized as of July 1, 2015:

- The discount rate was changed from 8.0% through June 30, 2017 and 8.5% thereafter to 8.0% for all years.
- The inflation assumption was changed from 3.00% to 2.75%
- The payroll growth assumption was changed from 3.75% to 3.50%.
- Assumed increases in member salaries were decreased by 0.25% at all ages.

The combined impact of the above changes was to increase the accrued liability by \$28.4 million and increase the required contribution by 2.0% of pay, as follows:

	<b>Before Changes</b>	<b>Reflecting Assumption Changes</b>
Normal Cost Rate, % of Pay	12.6%	13.4%
Amortization of Unfunded Accrued Liability, % of pay	-0.2%	1.0%
Expenses (% of Pay)	0.1%	0.1%
Total Required Contribution, % of Pay	12.5%	14.5%
Accrued Liability Funding Ratio	101.3%	95.6%
Projected Benefit Funding Ratio	110.3%	100.1%
Unfunded Accrued Liability (in millions)	(\$6.3)	\$22.1

### Valuation of Future Post-Retirement Benefit Increases

Benefit recipients received a post-retirement benefit increase of 1.0% on January 1, 2013 and January 1, 2014. Because the actuarial accrued liability funding ratio (on a market value of assets basis) was at least 90% as of July 1, 2013 and July 1, 2014, the benefit increase reverted to 2.5% on January 1, 2015.

If, after reverting to a 2.5% benefit increase, the funding ratio declines to less than 80% for one year or less than 85% for two consecutive years, the benefit increase will decrease to 1.0%. Benefit increases already granted, however, will not be affected.

In this valuation, we assumed all future postretirement benefit increases would equal 2.5%.

## Summary of Valuation Results

### Risk Measures Summary (*Dollars in Thousands*)

Valuation Date (6/30)	(1) Accrued Liabilities (AAL)	(2) Market Value of Assets	(3) Market Value Unfunded AAL	(4) Valuation Payroll	(5) Market Value Funded Ratio (2)/(1)	(6) Retiree Liabilities	(7) RetLiab/AAL (6)/(1)	(8) AAL/Payroll (1)/(4)	(9) Assets/Payroll (2)/(4)
2010	\$248,867	\$211,368	\$37,499	\$154,777	84.9%	\$ 39,723	16.0%	160.8%	136.6%
2011	284,593	280,031	4,562	165,077	98.4%	50,393	17.7%	172.4%	169.6%
2012	343,199	305,408	37,791	164,340	89.0%	63,419	18.5%	208.8%	185.8%
2013	381,179	366,750	14,429	164,820	96.2%	74,683	19.6%	231.3%	222.5%
2014	426,508	453,232	(26,724)	172,041	106.3%	85,638	20.1%	247.9%	263.4%
2015	498,052	490,731	7,321	179,623	98.5%	106,898	21.5%	277.3%	273.2%

Valuation Date (6/30)	(10) Portfolio StdDev	(11) Std Dev % of Pay (9) x (10)	(12) Unfunded/Payroll	(13) Non-Investment Cash Flow (NICF)	(14) NICF/Assets (13)/(2)	(15) Market Rate of Return	(16) 5-year Trailing Average
2010			24.2%	19,323	9.1%	15.7%	N/A
2011			2.8%	18,320	6.5%	23.0%	N/A
2012			23.0%	17,531	5.7%	2.3%	2.3%
2013			8.8%	16,964	4.6%	14.2%	6.2%
2014			-15.5%	17,031	3.8%	18.5%	14.5%
2015	14.1%	38.5%	4.1%	17,127	3.5%	4.4%	12.2%

(5). The Funded ratio is the most widely known measure of a plan's financial strength, but the trend in the funded ratio is much more important than the absolute ratio. The funded ratio should trend to 100%. As it approaches 100%, it is important to re-evaluate the level of investment risk in the portfolio and potentially to re-evaluate the assumed rate of return.

(6) and (7). The ratio of Retiree liabilities to total accrued liabilities gives an indication of the maturity of the system. As the ratio increases, cash flow needs increase, and the liquidity needs of the portfolio change. A ratio on the order of 50% indicates a maturing system.

(8) and (9) The ratios of liabilities and assets to payroll gives an indication of both maturity and volatility. Many systems have ratios between 500% and 700%. Ratios significantly above that range may indicate difficulty in supporting the benefit level as a level % of payroll.

(10) and (11). The portfolio standard deviation measures the volatility of investment return. When multiplied by the ratio of assets to payroll it gives the effect of a one standard deviation asset move as a percent of payroll. This figure helps users understand the difficulty of dealing with investment volatility and the challenges volatility brings to sustainability.

(12) The ratio of unfunded liability to payroll gives an indication of the plan sponsor's ability to actually pay off the unfunded liability. A ratio above approximately 300% or 400% may indicate difficulty in discharging the unfunded liability within a reasonable time frame.

(13) and (14) The ratio of Non-Investment Cash Flow to assets is an important measure of sustainability. Negative ratios are common and expected for a maturing system. In the longer term, this ratio should be on the order of approximately -4%. A ratio that is significantly more negative than that for an extended period could be a leading indicator of potential exhaustion of assets.

(15) and (16) Investment return is probably the largest single risk that most systems face. The year by year return and the 5 year geometric average give an indicator of the realism of the systems assumed return. Of course past performance is not a guarantee of future results.

## Supplemental Information

The remainder of the report includes information supporting the results presented in the previous sections.

- **Plan assets** presents information about the Plan's assets as reported by the Public Employees Retirement Association of Minnesota. The assets represent the portion of total fund liabilities that has been funded.
- **Membership data** presents and describes the membership data used in the valuation.
- **Development of costs** shows the liabilities for plan benefits and the derivation of the contribution amount.
- **Actuarial basis** describes the Plan provisions, as well as the methods and assumptions used to value the Plan. The valuation is based on the premise that the Plan is ongoing.
- **Additional schedules** shows the Schedule of Funding Progress and Schedule of Contributions.
- **Glossary** defines the terms used in this report.

## Plan Assets

### Statement of Fiduciary Net Position *(Dollars in Thousands)*

Assets in Trust	Market Value	
	June 30, 2015	June 30, 2014
Cash, equivalents, short term securities	\$ 9,901	\$ 12,591
Fixed income	115,387	105,666
Equity	304,773	277,713
SBI Alternative	60,509	57,118
Other	0	0
<b>Total Assets in Trust</b>	<b>\$ 490,570</b>	<b>\$ 453,088</b>
Assets Receivable	420	400
Amounts Payable	(259)	(256)
<b>Net Assets Held in Trust for Pension Benefits</b>	<b>\$ 490,731</b>	<b>\$ 453,232</b>

## Plan Assets

### Reconciliation of Plan Assets (*Dollars in Thousands*)

The following exhibit shows the revenue, expenses and resulting assets of the Fund as reported by the Public Employees Retirement Association for the Plan's prior two fiscal years.

<b>Change in Assets</b> <b>Year Ending</b>	<b>Market Value</b>	
	<b>June 30, 2015</b>	<b>June 30, 2014</b>
1. Fund balance at market value at end of prior year	\$ 453,232	\$ 366,750
2. Adjustment to match reported value	(1)	N/A
3. Fund balance at market value at beginning of year	\$ 453,231	\$ 366,750
4. Contributions		
a. Member	10,472	10,030
b. Employer	15,736	15,054
c. Other sources	0	0
d. Total contributions	26,208	25,084
5. Investment income		
a. Investment income/(loss)	21,039	70,079
b. Investment expenses	(666)	(628)
c. Net subtotal	20,373	69,451
6. Other	0	0
<b>7. Total income: (4.d.) + (5.c.) + (6.)</b>	<b>\$ 46,581</b>	<b>\$ 94,535</b>
8. Benefits Paid		
a. Annuity benefits	(7,777)	(6,711)
b. Refunds	(1,057)	(1,105)
c. Total benefits paid	(8,834)	(7,816)
9. Expenses		
a. Other	0	(1)
b. Administrative	(247)	(236)
c. Total expenses	(247)	(237)
<b>10. Total disbursements: (6.c.) + (7.c.)</b>	<b>(9,081)</b>	<b>(8,053)</b>
<b>11. Fund balance at market value at end of year</b>	<b>\$ 490,731</b>	<b>\$ 453,232</b>
12. Approximate return on market value of assets	4.4%	18.4%

## Plan Assets

### Actuarial Asset Value (Dollars in Thousands)

	<u>June 30, 2015</u>	<u>June 30, 2014</u>
1. Market value of assets available for benefits	\$ 490,731	\$ 453,232
2. Determination of average balance		
a. Total assets available at beginning of year	453,232	366,750
b. Total assets available at end of year	490,731	453,232
c. Net investment income for fiscal year	20,373	69,451
d. Average balance $[a. + b. - c.] / 2$	461,795	375,266
3. Expected return $[8.0\% * 2.d.]$	36,944	30,021
4. Actual return	20,373	69,451
5. Current year asset gain/(loss) $[4. - 3.]$	(16,571)	39,430
6. Unrecognized asset returns		
	<b>Original</b>	
	<b>Amount</b>	<b>Unrecognized Amount</b>
a. Year ended June 30, 2015	(\$16,571)	(13,257)
b. Year ended June 30, 2014	39,430	23,658
c. Year ended June 30, 2013	19,267	7,707
d. Year ended June 30, 2012	(16,702)	(3,340)
e. Year ended June 30, 2011	31,598	N/A
f. Unrecognized return adjustment		14,768
7. <b>Actuarial value at end of year (1. - 6.f.)</b>	<b>\$ 475,963</b>	<b>\$ 410,489</b>
8. Approximate return on actuarial value of assets during fiscal year	11.5%	13.0%
9. Ratio of actuarial value of assets to market value of assets	0.97	0.91

## Membership Data

### Distribution of Active Members

Age	Years of Service as of June 30, 2015									Total
	<3*	3 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35+	
< 25	271	5								276
Avg. Earnings	25,271	31,808								25,389
25 - 29	454	82	44							580
Avg. Earnings	32,969	46,954	50,236							36,256
30 - 34	232	84	229	50	1					596
Avg. Earnings	31,328	44,262	52,555	53,811	82,345					43,279
35 - 39	132	42	137	131	30					472
Avg. Earnings	31,954	46,690	54,865	59,939	58,397					49,363
40 - 44	76	27	106	129	111					449
Avg. Earnings	36,856	50,035	52,095	61,006	64,041					54,905
45 - 49	69	19	89	121	154					452
Avg. Earnings	34,423	53,430	58,529	62,211	68,794					59,118
50 - 54	33	22	61	99	178					393
Avg. Earnings	41,239	46,037	55,699	61,149	65,523					59,766
55 - 59	23	6	38	79	144					290
Avg. Earnings	38,336	39,284	54,423	61,000	68,862					61,795
60 - 64	6	5	35	30	73					149
Avg. Earnings	24,845	33,453	48,848	52,402	64,824					55,907
65 - 69	1		6	8	14					29
Avg. Earnings	14,185		40,063	53,737	64,435					54,709
70+	3			1	2					6
Avg. Earnings	5,800			44,496	62,908					31,285
<b>Total</b>	<b>1,300</b>	<b>292</b>	<b>745</b>	<b>648</b>	<b>707</b>					<b>3,692</b>
<b>Avg. Earnings</b>	<b>31,463</b>	<b>46,131</b>	<b>53,569</b>	<b>59,968</b>	<b>66,303</b>					<b>48,758</b>

\* This exhibit does not reflect service earned in other PERA plans or Combined Service Annuity benefits. It should not be relied upon as an indicator of non-vested status.

In each cell, the top number is the count of active participants for the age/service combination and the bottom number is average valuation earnings for the fiscal year ending on the valuation date.

## Membership Data

### Distribution of Service Retirements

Age	Years Retired as of June 30, 2015							Total
	<1	1 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25+	
<50								
Avg. Benefit								
50 - 54	11	16						27
Avg. Benefit	9,953	8,719						9,222
55 - 59	21	50	10					81
Avg. Benefit	9,869	9,209	5,680					8,944
60 - 64	35	109	56	1				201
Avg. Benefit	14,650	10,754	7,675	1,069				10,527
65 - 69	16	86	71	34				207
Avg. Benefit	13,392	10,070	6,303	4,207				8,072
70 - 74		22	40	25	2			89
Avg. Benefit		7,341	6,773	3,249	478			5,782
75 - 79		2	9	27	6			44
Avg. Benefit		6,865	4,941	2,682	443			3,029
80 - 84			2	3	1			6
Avg. Benefit			4,921	1,263	65			2,283
85 - 89								
Avg. Benefit								
90+								
Avg. Benefit								
<b>Total</b>	<b>83</b>	<b>285</b>	<b>188</b>	<b>90</b>	<b>9</b>			<b>655</b>
<b>Avg. Benefit</b>	<b>12,576</b>	<b>9,872</b>	<b>6,699</b>	<b>3,351</b>	<b>409</b>			<b>8,278</b>

In each cell, the top number is the count of retired participants for the age/years retired combination and the bottom number is the average annual benefit amount.

## Membership Data

### Distribution of Survivors

Age	Years Since Death as of June 30, 2015						Total
	<1	1 - 4	5 - 9	10 - 14	15 - 19	20 - 24	
<45	1	3	3	1			<b>8</b>
Avg. Benefit	6,140	7,465	5,335	218			<b>5,595</b>
45 - 49		2	1				<b>3</b>
Avg. Benefit		6,676	10,016				<b>7,789</b>
50 - 54	2	4	1				<b>7</b>
Avg. Benefit	12,773	14,296	2,343				<b>12,153</b>
55 - 59	1	1		1			<b>3</b>
Avg. Benefit	2,853	23,411		1,039			<b>9,101</b>
60 - 64		4	3	1			<b>8</b>
Avg. Benefit		6,708	6,574	1,248			<b>5,975</b>
65 - 69		1	1	1			<b>3</b>
Avg. Benefit		5,955	7,631	21,471			<b>11,686</b>
70 - 74	1	3	2	1			<b>7</b>
Avg. Benefit	1,193	4,089	3,897	8,525			<b>4,254</b>
75 - 79		1					<b>1</b>
Avg. Benefit		1,001					<b>1,001</b>
80 - 84							
Avg. Benefit							
85 - 89							
Avg. Benefit							
90+							
Avg. Benefit							
<b>Total</b>	<b>5</b>	<b>19</b>	<b>11</b>	<b>5</b>			<b>40</b>
<b>Avg. Benefit</b>	<b>7,146</b>	<b>8,547</b>	<b>5,774</b>	<b>6,500</b>			<b>7,353</b>

In each cell, the top number is the count of survivors for the age/years since death combination and the bottom number is the average annual benefit amount.

## Membership Data

### Distribution of Disability Retirements

Age	Years Disabled as of June 30, 2015 *						Total
	<1	1 - 4	5 - 9	10 - 14	15 - 19	20 - 24	
< 45		9	9				<b>18</b>
Avg. Benefit		14,281	12,225				<b>13,253</b>
45 - 49	2	5	8				<b>15</b>
Avg. Benefit	29,519	18,517	21,937				<b>21,808</b>
50 - 54	1	10	7	2	2		<b>22</b>
Avg. Benefit	13,852	11,125	16,569	15,135	23,522		<b>14,472</b>
55 - 59	2	6	16	5			<b>29</b>
Avg. Benefit	15,544	15,491	19,447	26,195			<b>19,523</b>
60 - 64	1	7	14	13	1		<b>36</b>
Avg. Benefit	14,308	10,845	16,401	13,969	28,382		<b>14,717</b>
65 - 69	14	21	2				<b>37</b>
Avg. Benefit	16,645	18,719	13,488				<b>17,652</b>
70 - 74			8				<b>8</b>
Avg. Benefit			15,752				<b>15,752</b>
75+			2	2			<b>4</b>
Avg. Benefit			5,567	6,997			<b>6,282</b>
<b>Total</b>	<b>20</b>	<b>58</b>	<b>66</b>	<b>22</b>	<b>3</b>		<b>169</b>
<b>Avg. Benefit</b>	<b>17,566</b>	<b>15,419</b>	<b>16,764</b>	<b>16,220</b>	<b>25,142</b>		<b>16,475</b>

\* Based on effective date as provided by PERA, "Years Disabled" may reflect years since age 65 for members over age 65.

In each cell, the top number is the count of disabled participants for the age/years disabled combination and the bottom number is the average annual benefit amount.

## Membership Data

### Reconciliation of Members

	Terminated			Recipients			Total
	Actives	Deferred Retirement	Other Non-Vested	Service Retirement	Disability Retirement	Survivor	
<b>Members on 7/1/2014</b>	<b>3,603</b>	<b>2,380</b>	<b>1,936</b>	<b>571</b>	<b>162</b>	<b>36</b>	<b>8,688</b>
New members	633	0	0	0	0	0	<b>633</b>
Return to active	29	(15)	(14)	0	0	0	<b>0</b>
Terminated non-vested	(250)	0	250	0	0	0	<b>0</b>
Service retirements	(61)	(27)	0	88	0	0	<b>0</b>
Terminated deferred	(210)	210	0	0	0	0	<b>0</b>
Terminated refund/transfer	(40)	(38)	(29)	0	0	0	<b>(107)</b>
Deaths	(3)	(3)	(2)	(6)	(4)	0	<b>(18)</b>
New beneficiary	0	0	0	0	0	5	<b>5</b>
Disabled	(9)	0	0	0	9	0	<b>0</b>
Data correction	0	113	(2)	2	2	(1)	<b>114</b>
Net change	89	240	203	84	7	4	<b>627</b>
<b>Members on 6/30/2015</b>	<b>3,692</b>	<b>2,620</b>	<b>2,139</b>	<b>655</b>	<b>169</b>	<b>40</b>	<b>9,315</b>

<b>Terminated Member Statistics</b>	<b>Deferred Retirement</b>	<b>Other Non-Vested</b>	<b>Total</b>
Number	2,620	2,139	4,759
Average age	41.3	37.8	39.7
Average service	3.5	0.9	2.3
Average annual benefit, with augmentation to Normal Retirement Date and 30% CSA load	\$5,299	N/A	\$5,299
Average refund value, with 30% CSA load	\$10,064	\$1,422	\$6,180

## Development of Costs

### Actuarial Valuation Balance Sheet (*Dollars in Thousands*)

The actuarial balance sheet is based on the principle that the long-term projected benefit obligations of the Plan should be ideally equal to the long-term resources available to fund those obligations. The resources available to meet projected obligations for current members consist of current fund assets plus the present value of anticipated future contributions intended to fund benefits for current members. In the exhibit below, B.2 is the estimated present value of contributions to fund the normal cost rate for current members until their respective termination dates. Item B.1 is the present value of the total 14.58% statutory contribution net of normal cost and anticipated Plan expenses during the period from the valuation date to the statutory unfunded amortization date.

The contributions made in excess of amounts required for current benefit payments are accumulated as a reserve to help meet benefit payments in later years. It is this reserve system which permits the establishment of a level rate of contribution each year.

				<u>June 30, 2015</u>
A. Actuarial Value of Assets				\$ 475,963
B. Expected Future Assets				
1. Present value of expected future statutory supplemental contributions				22,873
2. Present value of future normal cost contributions				189,224
3. Total expected future assets: (1.) + (2.)				\$ 212,097
C. Total Current and Expected Future Assets: (A. + B.3)				\$ 688,060
D. Current Benefit Obligations*				
1. Benefit recipients	<u>Non-Vested</u>	<u>Vested</u>	<u>Total</u>	
a. Service retirements	\$ 0	\$ 71,287	\$ 71,287	
b. Disability retirements	0	32,136	32,136	
c. Survivors	0	3,475	3,475	
2. Deferred retirements with augmentation	0	86,264	86,264	
3. Former members without vested rights	1,532	0	1,532	
4. Active members	10,636	249,270	259,906	
5. Total Current Benefit Obligations	\$ 12,168	\$ 442,432	\$ 454,600	
E. Expected Future Benefit Obligations				\$ 232,676
F. Total Current and Expected Future Benefit Obligations**				\$ 687,276
G. Unfunded Current Benefit Obligations: (D.5.) - (A.)				(21,363)
H. Unfunded Current and Future Benefit Obligations: (F.) - (C.)				(784)
I. Accrued Benefit Funding Ratio: (A.)/(D.)				104.70%
J. Projected Benefit Funding Ratio: (C.)/(F.)				100.11%

\* Present value of credited projected benefits (projected compensation, current service).

\*\* Present value of projected benefits (projected compensation, projected service).

## Development of Costs

### Determination of Unfunded Actuarial Accrued Liability and Supplemental Contribution Rate *(Dollars in Thousands)*

	Actuarial Present Value of Projected Benefits	Actuarial Present Value of Future Normal Costs	Actuarial Accrued Liability
A. Determination of Actuarial Accrued Liability (AAL)			
1. Active members			
a. Retirement annuities	\$ 391,820	\$ 120,556	\$ 271,264
b. Disability benefits	48,061	27,003	21,058
c. Survivor's benefits	7,014	2,577	4,437
d. Deferred retirements	43,430	32,367	11,063
e. Refunds*	<u>2,257</u>	<u>6,721</u>	<u>(4,464)</u>
f. Total	\$ 492,582	\$ 189,224	\$ 303,358
2. Deferred retirements with future augmentation	86,264	0	86,264
3. Former members without vested rights	1,532	0	1,532
4. Annuitants	<u>106,898</u>	<u>0</u>	<u>106,898</u>
5. Total	\$ 687,276	\$ 189,224	\$ 498,052
B. Determination of Unfunded Actuarial Accrued Liability (UAAL)			
1. Actuarial accrued liability			\$ 498,052
2. Current assets (AVA)			<u>475,963</u>
3. Unfunded actuarial accrued liability			\$ 22,089
C. Determination of Supplemental Contribution Rate			
1. Present value of future payrolls through the amortization date of June 30, 2031			\$2,157,854
2. Supplemental contribution rate: $(B.3.) / (C.1.)$			1.02% **

\* Includes non-vested refunds and non-married survivor benefits only.

\*\* The amortization factor as of June 30, 2015 is 11.3668.

## Development of Costs

### Changes in Unfunded Actuarial Accrued Liability (UAAL) (Dollars in Thousands)

	Year Ending June 30, 2015		
	Actuarial Accrued Liability	Current Assets	Unfunded Actuarial Accrued Liability
A. At beginning of year	\$ 426,508	\$ 410,489	\$ 16,019
B. Changes due to interest requirements and current rate of funding			
1. Normal cost, including expenses	\$ 23,242	0	\$ 23,242
2. Benefit payments	(8,834)	(8,834)	0
3. Contributions	0	26,208	(26,208)
4. Interest on A., B.1., B.2. and B.3.	<u>36,562</u>	<u>33,534</u>	<u>3,028</u>
5. Total (B.1. + B.2. + B.3. + B.4.)	50,970	50,908	62
C. Expected unfunded actuarial accrued liability at end of year (A. + B.5.)			\$ 16,081
D. Increase (decrease) due to actuarial losses (gains) because of experience deviations from expected			
1. Age and Service Retirements			\$ (928)
2. Disability Retirements			(795)
3. Death-in-Service Benefits			(298)
4. Withdrawals			(3,434)
5. Salary increases			(4,167)
6. Investment income			(14,566)
7. Mortality of annuitants			110
8. Other items			1,745
9. Total			\$ (22,333)
E. Unfunded actuarial accrued liability at end of year before Plan amendments and changes in actuarial assumptions (C. + D.9.)			(6,252)
F. Change in unfunded actuarial accrued liability due to changes in Plan provisions			0
G. Change in unfunded actuarial accrued liability due to changes in actuarial assumptions			28,341
H. Change in unfunded actuarial accrued liability due to changes in decrement timing and miscellaneous methodology			0
I. Unfunded actuarial accrued liability at end of year (E. + F. + G. + H.)*			\$ 22,089

\* The unfunded actuarial accrued liability on a market value of assets basis is \$7,321.

## Development of Costs

### Determination of Contribution Sufficiency/(Deficiency) (*Dollars in Thousands*)

The required contribution is defined in Minnesota statutes as the sum of normal cost, a supplemental contribution to amortize the UAAL, and an allowance for expenses.

	<u>Percent of Payroll</u>	<u>Dollar Amount</u>
A. Statutory contributions - Chapter 353E		
1. Employee contributions	5.83%	\$ 11,068
2. Employer contributions	8.75%	16,611
3. Total	<u>14.58%</u>	<u>\$ 27,679</u>
B. Required contributions - Chapter 356		
1. Normal cost		
a. Retirement benefits	8.73%	\$ 16,572
b. Disability benefits	2.07%	3,930
c. Survivors	0.18%	342
d. Deferred retirement benefits	1.95%	3,702
e. Refunds*	0.45%	854
f. Total	<u>13.38%</u>	<u>\$ 25,400</u>
2. Supplemental contribution amortization of Unfunded Actuarial Accrued Liability by June 30, 2031	1.02%	\$ 1,936
3. Allowance for expenses	<u>0.14%</u>	<u>\$ 266</u>
4. Total	14.54% **	\$ 27,602
C. Contribution Sufficiency/(Deficiency) (A.3. - B.4.)	0.04%	\$ 77

Note: Projected annual payroll for fiscal year beginning on the valuation date: \$189,838.

\* Includes non-vested refunds and non-married survivor benefits only.

\*\* The required contribution on a market value of assets basis is 13.86% of payroll.

## **Actuarial Basis**

### **Actuarial Methods**

All actuarial methods are prescribed by Minnesota Statutes, the Legislative Commission on Pensions and Retirement, or the Board of Trustees. Different methodologies may also be reasonable and results based on other methodologies would be different.

#### **Actuarial Cost Method**

Actuarial Accrued Liability and required contributions in this report are computed using the Entry Age Normal Cost Method. This method is prescribed by Minnesota Statute. Under this method, a normal cost is developed by amortizing the actuarial value of benefits expected to be received by each active participant (as a level percentage of pay) over the total working lifetime of that participant, from hire to termination. Age as of the valuation date was calculated based on the dates of birth provided by the Fund. Entry age for valuation purposes was calculated as the age on the valuation date minus the provided years of service on the valuation date.

To the extent that current assets and future normal costs do not support participants' expected future benefits, an unfunded actuarial accrued liability ("UAAL") develops. The UAAL is amortized over the statutory amortization period using level percent of payroll assuming payroll increases. The total contribution developed under this method is the sum of normal cost, expenses, and the payment toward the UAAL.

#### **Valuation of Future Post-Retirement Benefit Increases**

If the Plan has reached the funding ratio threshold required to pay a 2.5% benefit increase, Minnesota Statutes require the 2.5% benefit increase rate to be reflected in the liability calculations. If the Plan has not yet reached the funding ratio threshold required to pay a 2.5% benefit increase, Minnesota Statutes require a projection to be performed to determine the expected attainment of the funding ratio threshold, and the expected reversion to a 2.5% benefit increase rate must be reflected in the liability calculations.

#### **Funding Objective**

The fundamental financing objective of the fund is to establish contribution rates which, when expressed as a percentage of active member payroll, will remain approximately level from generation to generation and meet the required deadline for full funding.

#### **Decrement Timing**

All decrements are assumed to occur mid-year.

## Actuarial Basis

### Actuarial Methods (Concluded)

#### Asset Valuation Method

The assets are valued based on a five-year moving average of expected and market values (five-year average actuarial value) determined as follows:

- At the end of each plan year, an average asset value is calculated as the average of the market asset value at the beginning and end of the fiscal year net of investment income for the fiscal year;
- The investment gain or (loss) is taken as the excess of actual investment income over the expected investment income based on the average asset value as calculated above;
- The investment gain or (loss) so determined is recognized over five years at 20% per year; and
- The asset value is the sum of the market asset value plus the scheduled recognition of investment gains or (losses) during the current and the preceding four fiscal years.

#### Payment on the Unfunded Actuarial Accrued Liability

Payment equals a level percentage of payroll each year to the statutory amortization date of June 30, 2031 assuming payroll increases of 3.50% per annum. If there is a negative Unfunded Actuarial Accrued Liability, the surplus amount is amortized over 30 years as a level percentage of payroll. If the unfunded liability increases due to changes in benefits, assumptions, or methods, the statutory amortization date will be re-determined. Projected payroll is multiplied by 0.959 in the determination of the present value of future payroll to account for timing differences (as required by the Standards for Actuarial Work).

#### Changes in Methods since Prior Valuation

Based on direction from the LCPR's actuary, the July 1, 2014 entry age normal accrued liability and normal cost were calculated using an equivalent single interest rate of 8.43% due to the statutory select and ultimate discount rate structure. This method is no longer needed since the discount rate was changed from the select and ultimate assumptions to 8.00% for all years effective July 1, 2015.

## Actuarial Basis

### Summary of Actuarial Assumptions

The following assumptions were used in valuing the liabilities and benefits under the Plan. All actuarial assumptions are prescribed by Minnesota Statutes, the Legislative Commission on Pensions and Retirement (LCPR), or the Board of Trustees. These parties are responsible for selecting the assumptions used for this valuation. The assumptions prescribed are based on the last experience study, dated February 2012, prepared by a former actuary and an economic assumption review dated September 11, 2014.

The Allowance for Combined Service Annuity was also based on a recommendation by a former actuary. We are unable to judge the reasonableness of this assumption without performing a substantial amount of additional work beyond the scope of the assignment.

Investment return	8.00% per annum								
Benefit increases after retirement	2.5% per annum.								
Salary increases	Reported salary at valuation date increased according to the rate table, to current fiscal year and annually for each future year. Prior fiscal year salary is annualized for members with less than one year of service earned during the year.								
Inflation	2.75% per year.								
Payroll growth	3.50% per year.								
Mortality rates									
Healthy Pre-retirement	RP-2000 employee generational mortality table projected with mortality improvement scale AA, white collar adjustment.								
Healthy Post-retirement	RP-2000 annuitant generational mortality table projected with mortality improvement scale AA, white collar adjustment.								
	The RP-2000 employee mortality table as published by the Society of Actuaries (SOA) contains mortality rates for ages 15 to 70 and the annuitant mortality table contains mortality rates for ages 50 to 95. We have applied the annuitant mortality table for active members beyond age 70 until the assumed retirement age and the employee mortality table for annuitants younger than age 50.								
Disabled	RP-2000 disabled mortality table.								
Retirement	Members retiring from active status are assumed to retire according to the age related rates shown in the rate table. Members who have attained the highest assumed retirement age are assumed to retire in one year.								
Withdrawal	Select and Ultimate rates based on actual experience. Ultimate rates after the third year are shown in rate table. Select rates in the first three years are:								
	<table border="1"> <thead> <tr> <th>Year</th> <th>Select Withdrawal Rates</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>25%</td> </tr> <tr> <td>2</td> <td>20%</td> </tr> <tr> <td>3</td> <td>15%</td> </tr> </tbody> </table>	Year	Select Withdrawal Rates	1	25%	2	20%	3	15%
Year	Select Withdrawal Rates								
1	25%								
2	20%								
3	15%								

## Actuarial Basis

### Summary of Actuarial Assumptions (Continued)

Disability	Age-related rates based on experience; see table of sample rates. All incidences are assumed to be duty-related.
Allowance for combined service annuity	Liabilities for former members are increased by 30.00% to account for the effect of some participants having eligibility for a Combined Service Annuity.
Administrative expenses	Prior year administrative expenses expressed as percentage of prior year projected payroll.
Refund of contributions	Account balances accumulate interest until normal retirement date and are discounted back to the valuation date. All employees withdrawing after becoming eligible for a deferred benefit take the larger of their contributions accumulated with interest or the value of their deferred benefit.
Commencement of deferred benefits	Members receiving deferred annuities (including current terminated deferred members) are assumed to begin receiving benefits at age 55.
Percentage married	85% of active members are assumed to be married. Actual marital status is used for members in payment status.
Age of spouse	Females are assumed to be three years younger than their male spouses. For members in payment status, actual spouse date of birth is used, if provided.
Eligible children	Retiring members are assumed to have no dependent children.
Form of payment	<p>Married members retiring from active status are assumed to elect subsidized joint and survivor form of annuity as follows:</p> <p>Males:        5% elect 25% Joint &amp; Survivor option                          10% elect 50% Joint &amp; Survivor option                          10% elect 75% Joint &amp; Survivor option                          35% elect 100% Joint &amp; Survivor option</p> <p>Females:      5% elect 25% Joint &amp; Survivor option                          5% elect 50% Joint &amp; Survivor option                          5% elect 75% Joint &amp; Survivor option                          5% elect 100% Joint &amp; Survivor option</p> <p>Remaining married members and unmarried members are assumed to elect the Straight Life option.</p> <p>Members receiving deferred annuities (including current terminated deferred members) are assumed to elect a straight life annuity.</p>
Eligibility testing	Eligibility for benefits is determined based upon the age nearest birthday and service on the date the decrement is assumed to occur.
Decrement operation	Withdrawal decrements do not operate during retirement eligibility.
Service credit accruals	It is assumed that members accrue one year of service credit per year.

## Actuarial Basis

### Summary of Actuarial Assumptions (Continued)

Unknown data for certain members	<p>To prepare this report, GRS has used and relied on participant data supplied by the Fund. Although GRS has reviewed the data in accordance with Actuarial Standards of Practice No. 23, GRS has not verified or audited any of the data or information provided.</p> <p>In cases where submitted data was missing or incomplete, the following assumptions were applied:</p> <p><u>Data for active members:</u></p> <p>There were 18 members reported with zero salary. We used prior year salary (14 members), if available; otherwise high five salary with a 10% load to account for salary increases (three members). If neither prior year salary or high five salary was available, we assumed a value of \$35,000 (one member).</p> <p>There were also 26 members reported without a gender and one member reported without a date of birth. We assumed an entry age of 31 and male gender.</p> <p><u>Data for terminated members:</u></p> <p>We calculated benefits for these members using the reported Average Salary and credited service. There were no members reported without Average Salary. If credited service was not reported (25 members), we used elapsed time from hire date to termination date (15 members), otherwise we assumed nine years of service (10 members). If termination date was not reported (11 members), we assumed the termination date was equal to the hire date plus credited service, otherwise the valuation date.</p> <p>There were no members reported without a date of birth. There were two members reported without a gender; male was assumed.</p> <p><u>Data for retired members:</u></p> <p>There were no members reported without a date of birth, gender or benefit.</p>
Changes in actuarial assumptions	<p>The discount rate was changed from 8.0% through June 30, 2017 and 8.5% thereafter to 8.0% for all years.</p> <p>The inflation assumption was changed from 3.00% to 2.75%</p> <p>The payroll growth assumption was changed from 3.75% to 3.50%.</p> <p>Assumed increases in member salaries were decreased by 0.25% at all ages.</p>

## Actuarial Basis

### Summary of Actuarial Assumptions (Continued)

Age	Rate (%)*					
	Healthy		Healthy		Disability	
	Post-Retirement Mortality**		Pre-Retirement Mortality**		Mortality	
	Male	Female	Male	Female	Male	Female
20	0.03%	0.02%	0.03%	0.02%	2.26%	0.75%
25	0.04	0.02	0.04	0.02	2.26	0.75
30	0.04	0.03	0.04	0.03	2.26	0.75
35	0.06	0.05	0.06	0.05	2.26	0.75
40	0.09	0.06	0.09	0.06	2.26	0.75
45	0.13	0.10	0.13	0.10	2.26	0.75
50	0.60	0.24	0.20	0.16	2.90	1.15
55	0.54	0.35	0.27	0.24	3.54	1.65
60	0.66	0.56	0.43	0.38	4.20	2.18
65	1.16	0.91	0.67	0.59	5.02	2.80
70	1.93	1.52	0.98	0.88	6.26	3.76

\* Generally, mortality rates are expected to increase as age increases. Due to the combination of pre-retirement rates, post-retirement rates, the white collar adjustment, and Projection Scale AA, the prescribed mortality tables have a few ages where assumed mortality decreases slightly instead of increases. We have used the rates as prescribed, but note that the prescribed assumption may not be reasonable at every age. If the rates were reasonably adjusted so that they decreased at all ages, we would not expect the valuation results to be materially different.

\*\* These rates were adjusted for mortality improvements using projection scale AA.

Age	Withdrawal Rates		Disability Retirement	
	Male	Female	Male	Female
20	14.70%	14.20%	0.04%	0.04%
25	14.70%	14.20%	0.06%	0.06%
30	9.10%	11.40%	0.10%	0.08%
35	6.00%	8.60%	0.18%	0.11%
40	4.40%	6.90%	0.23%	0.18%
45	3.40%	4.30%	0.34%	0.39%
50	2.40%	3.10%	0.55%	0.70%
55	1.40%	2.20%	0.88%	1.18%
60	0.00%	0.00%	1.41%	2.41%
65	0.00%	0.00%	1.67%	2.67%

## Actuarial Basis

### Summary of Actuarial Assumptions (Concluded)

Age	Retirement	Salary Scale	
		Age	Increase
50	3%	20	8.75%
51	2	25	7.50
52	2	30	6.50
53	2	35	6.00
54	5	40	5.50
55	20	45	4.75
56	8	50	4.75
57	8	55	4.50
58	8	60	4.00
59	8	65	3.75
60	15	70+	3.75
61	15		
62	30		
63	30		
64	30		
65	40		
66	40		
67	40		
68	40		
69	40		
70+	100		

## Actuarial Basis

### Summary of Plan Provisions

Following is a summary of the major plan provisions used in the valuation of this report. PERA is solely responsible for the validity, accuracy and comprehensiveness of this information. If any of the plan provisions shown below are not accurate and complete, the valuation results may differ significantly from those shown in this report and may require a revision of this report.

Plan year	July 1 through June 30.				
Eligibility	Local government employees in covered correctional service for a county administered jail or correctional facility or in a regional correctional facility administered by multiple counties, who are directly responsible for security, custody and control of persons confined in jail or facility, who are expected to respond to incidents within the jail or facility, and who are not members of the Public Employees Police and Fire Fund.				
Contributions	Shown as a percent of salary: <table style="margin-left: 40px;"> <tr> <td><u>Member</u></td> <td>5.83%</td> </tr> <tr> <td><u>Employer</u></td> <td>8.75%</td> </tr> </table> <p>Member contributions are “picked up” according to the provisions of Internal Revenue Code 414(h).</p>	<u>Member</u>	5.83%	<u>Employer</u>	8.75%
<u>Member</u>	5.83%				
<u>Employer</u>	8.75%				
Allowable service	Local Government Correctional Service during which member contributions were made (effective July 1, 1999). May also include certain leaves of absence, military service and periods while temporary Worker’s Compensation is paid.				
Salary	Includes amounts deducted for deferred compensation or supplemental retirement plans, net income from fees and sick leave payments funded by the employer. Excludes unused annual leaves and sick leave payments, severance payments, Workers’ Compensation benefits and employer-paid flexible spending accounts, cafeteria plans, healthcare expense accounts, day-care expenses, fringe benefits and the cost of insurance coverage.				
Average salary	Average of the five highest successive years of salary. Average Salary is based on all Allowable Service if less than five years.				
Vesting	<table style="margin-left: 40px;"> <tr> <td>Hired before July 1, 2010:</td> <td>100% vested after 3 years of Allowable Service.</td> </tr> <tr> <td>Hired after June 30, 2010:</td> <td>50% vested after 5 years of Allowable Service; 60% vested after 6 years of Allowable Service; 70% vested after 7 years of Allowable Service; 80% vested after 8 years of Allowable Service; 90% vested after 9 years of Allowable Service; and 100% vested after 10 years of Allowable Service.</td> </tr> </table>	Hired before July 1, 2010:	100% vested after 3 years of Allowable Service.	Hired after June 30, 2010:	50% vested after 5 years of Allowable Service; 60% vested after 6 years of Allowable Service; 70% vested after 7 years of Allowable Service; 80% vested after 8 years of Allowable Service; 90% vested after 9 years of Allowable Service; and 100% vested after 10 years of Allowable Service.
Hired before July 1, 2010:	100% vested after 3 years of Allowable Service.				
Hired after June 30, 2010:	50% vested after 5 years of Allowable Service; 60% vested after 6 years of Allowable Service; 70% vested after 7 years of Allowable Service; 80% vested after 8 years of Allowable Service; 90% vested after 9 years of Allowable Service; and 100% vested after 10 years of Allowable Service.				
<b>Retirement</b>					
<u>Normal retirement benefit</u>					
Age/service requirement	Age 55 and vested. Proportionate Retirement Annuity is available at age 65 and one year of Allowable Service.				
Amount	1.9% of Average Salary for each year of Allowable Service, pro rata for completed months.				

## Actuarial Basis

### Summary of Plan Provisions (Continued)

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#### Retirement (Continued)

##### Early Retirement

Age/service requirement    Age 50 and vested.

Amount                            Normal Retirement Benefit based on Allowable Service and Average Salary at retirement date with actuarial reduction to commencement age assuming 3% augmentation to age 55 (2.50% if hired after June 30, 2006).

##### Form of payment

Life annuity. Actuarially equivalent options are:

25%, 50%, 75% or 100% Joint and Survivor. If a Joint and Survivor benefit is elected and the beneficiary predeceases the annuitant, the annuitant's benefit increases to the Life Annuity amount. This "bounce back" is subsidized by the plan.

##### Benefit increases

Benefit recipients received a post-retirement benefit increase of 1.0% on January 1, 2013 and January 1, 2014. Because the actuarial accrued liability funding ratio (on a market value of assets basis) reached 90% for two consecutive years, the benefit increase reverted to 2.5% on January 1, 2015. If the funding ratio declines to less than 80% for one year or less than 85% for two consecutive years, the benefit increase will decrease to 1.0%.

A benefit recipient who has been receiving a benefit for at least 12 full months as of June 30 will receive a full increase. Members receiving benefits for at least one month but less than 12 full months as of June 30 will receive a pro rata increase.

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#### Disability

##### Duty Disability

Age/service requirement    Member who cannot perform his duties as a direct result of a disability relating to an act of duty specific to protecting the property and personal safety of others.

Amount                            47.50% of Average Salary plus 1.90% of Average Salary for each year in excess of 25 years of Allowable Service (pro rata for completed months).

Payment begins at disability and ends at age 65 or earlier if disability ceases or death occurs. Benefits may be paid upon re-employment but salary plus benefit cannot exceed current salary of position held at time of disability.

##### Regular Disability

Age/service requirement    At least one year of Allowable Service and a disability preventing member from performing normal duties that arise out of activities not related to covered employment or while at work, activities related to duties that do not present inherent dangers specific to occupation.

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## Actuarial Basis

### Summary of Plan Provisions (Continued)

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<b>Disability (Continued)</b>	
Amount	Normal Retirement Benefit based on Allowable Service (minimum of 10 years) and Average Salary at disability.  Payment begins at disability and ends at age 65 or earlier if disability ceases or death occurs. Benefits may be paid upon re-employment but salary plus benefit cannot exceed current salary of position held at time of disability.
<u>Retirement benefit</u>	
Age/service requirement	Age 65 with continued disability.
Amount	Any optional annuity continues. Otherwise, the larger of the disability benefit paid before age 65 or the normal retirement benefit available at age 65, or an actuarially equivalent optional annuity.
<u>Form of payment</u>	Same as for retirement.
<u>Benefit increases</u>	Same as for retirement.
<b>Death</b>	
<u>Surviving spouse benefit</u>	
Age/service requirement	Vested active member at any age or vested former member age 50 or older who dies before retirement or disability benefit commences. If an active member dies, benefits may commence immediately, regardless of age.
Amount	Surviving spouse receives the 100% joint and survivor benefit using the Normal Retirement formula above. If commencement is prior to age 55, the appropriate early retirement formula described above applies except that one-half the monthly reduction factor is used from age 50 to the commencement age. In lieu of this benefit, the surviving spouse may elect a refund of contributions with interest or an actuarially equivalent term certain annuity (lump sum payable to estate at death).
Benefit increases	Same as for retirement.
<u>Surviving dependent children's benefit</u>	
Age/service requirement	If no surviving spouse, all dependent children (biological or adopted) below age 20 who are dependent for more than half of their support on deceased member.
Amount	Actuarially equivalent to surviving spouse 100% joint and survivor annuity payable to the later of age 20 or five years. The amount is to be proportionally divided among surviving children.
<u>Refund of contributions</u>	
Age/service requirement	Active employee dies and survivor benefits paid are less than member's contributions or a former employee dies before annuity begins.

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## Actuarial Basis

### Summary of Plan Provisions (Continued)

<b>Death (Continued)</b>	
Amount	If no survivor benefits are paid, the member's contributions with 6.00% interest until June 30, 2011; 4.00% interest thereafter. If survivor benefits are paid and accumulated contributions exceed total payments to the surviving spouse and children, then the remaining contributions are paid out.
<b>Termination</b>	
<u>Refund of contributions</u>	
Age/service requirement	Termination of local government service.
Amount	If member terminated before July 1, 2011, member's contributions with 6.00% interest compounded annually until June 30, 2011; 4.00% interest thereafter. If member terminated after June 30, 2011, member's contributions credited with 4% interest compounded annually.
<u>Deferred benefit</u>	
Age/service requirement	A deferred annuity may be elected in lieu of a refund if vested.  Partially or fully vested.
Amount	Benefit computed under law in effect at termination and increased by the following percentage (augmentation), compounded annually, if termination of employment is prior to January 1, 2012:  (a.) 3.00% (2.50% if hired after June 30, 2006) until the earlier of January 1 of the year following attainment of age 55 and January 1, 2012; (b.) 5.00% (2.50% if hired after June 30, 2006) thereafter until the earlier of the date the annuity begins and January 1, 2012; and (c.) 1.00% from January 1, 2012 thereafter.  If a member terminates employment after 2011, they are not eligible for augmentation.
<u>Form of payment</u>	Same as for retirement.
<b>Actuarially equivalent factors</b>	Actuarially equivalent factors based on the RP-2000 mortality table for healthy annuitants, white collar adjustment, projected to 2026 using scale AA, no setbacks, blended 65% males, 6.0% post-retirement interest, and 8.5% pre-retirement interest. The post-retirement interest rate assumption will change to 6.5% on the earlier of the effective date of the next mortality adjustment or July 1, 2017.

## Actuarial Basis

### Summary of Plan Provisions (Concluded)

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<b>Combined service annuity</b>	<p>Members are eligible for combined service benefits if they:</p> <ul style="list-style-type: none"><li>(a.) Meet minimum retirement age for each plan participated in and total public service meets the vesting requirements of each plan;</li><li>or</li><li>(b.) Have three or more years of service under PERA and the covered fund(s) (if hired prior to July 1, 2010).</li></ul> <p>Other requirements for combined service include:</p> <ul style="list-style-type: none"><li>(a.) Member must have at least six months of allowable service credit in each plan worked under; and</li><li>(b.) Member may not be in receipt of a benefit from another plan.</li></ul> <p>Members who meet the above requirements must have their benefit based on the following:</p> <ul style="list-style-type: none"><li>(a.) Allowable service in all covered plans are combined in order to determine eligibility for early retirement.</li><li>(b.) Average salary is based on the high five consecutive years during their entire service in all covered plans.</li></ul>
<b>Changes in plan provisions</b>	None.

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## Additional Schedules

### Schedule of Funding Progress<sup>1</sup> (Dollars in Thousands)

Actuarial Valuation Date	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) (b)	Unfunded (Overfunded) AAL (UAAL) (b) - (a)	Funded Ratio (a)/(b)	Actual Covered Payroll (Previous FY) (c)	UAAL as a Percentage of Covered Payroll [(b)-(a)]/(c)
7-1-2002	\$ 40,105	\$ 42,144	\$ 2,039	95.16 %	\$ 101,309	2.01 %
7-1-2003	56,487	62,542	6,055	90.32	110,296	5.49
7-1-2004	75,515	85,693	10,178	88.12	109,600	9.29
7-1-2005	98,156	108,926	10,770	90.11	116,849	9.22
7-1-2006	125,776	133,306	7,530	94.35	125,189	6.01
7-1-2007	159,548	162,169	2,621	98.38	134,117	1.95
7-1-2008	192,937	192,572	(365)	100.19	154,202	(0.24)
7-1-2009	217,577	229,383	11,806	94.85	154,650	7.63
7-1-2010	242,019	248,867	6,848	97.25	154,777	4.42
7-1-2011	274,704	284,593	9,889	96.53	165,077 <sup>2</sup>	5.99
7-1-2012	306,454	343,199	36,745	89.29	164,340 <sup>2</sup>	22.36
7-1-2013	346,778	381,179	34,401	90.98	164,820 <sup>2</sup>	20.87
7-1-2014	410,489	426,508	16,019	96.24	172,041 <sup>2</sup>	9.31
7-1-2015	475,963	498,052	22,089	95.56	179,623 <sup>2</sup>	12.30

<sup>1</sup> Information prior to 2012 provided by prior actuaries. See prior reports for additional detail.

<sup>2</sup> Assumed equal to actual member contributions divided by 5.83%.

## Additional Schedules

### Schedule of Contributions from the Employer and Other Contributing Entities<sup>1</sup> (Dollars in Thousands)

Plan Year Ended June 30	Actuarially Required Contribution Rate (a)	Actual Covered Payroll (b)	Actual Member Contributions (c)	Annual Required Contributions [(a)x(b)] - (c) = (d)	Actual Employer Contributions <sup>2</sup> (e)	Percentage Contributed (e)/(d)
2002	14.21 %	\$ 101,309	\$ 5,882	\$ 8,514	\$ 8,830	103.71%
2003	14.10	110,296	6,430	9,122	9,645	105.74
2004	14.15	109,600	6,672	8,837	10,029	113.50
2005	13.06	116,849	7,192	8,068	10,814	134.03
2006	13.09	125,189	7,881	8,507	11,826	139.02
2007	12.71	134,117	8,335	8,712	12,499	143.48
2008	12.37	154,202	8,922	10,153	13,388	131.87
2009	13.50	154,650	9,409	11,469	14,124	123.15
2010	14.03	154,777	9,442	12,273	14,170	115.46
2011	13.21	165,077 <sup>3</sup>	9,624	12,183	14,289	117.29
2012	13.42	164,340 <sup>3</sup>	9,581	12,473	14,320	114.80
2013	14.45	164,820 <sup>3</sup>	9,609	14,207	14,498	102.04
2014	14.32	172,041 <sup>3</sup>	10,030	14,606	15,054	103.07
2015	13.49	179,623 <sup>3</sup>	10,472	13,759	15,736	114.37
2016	14.54					

<sup>1</sup> Information prior to 2012 provided by prior actuary. See prior reports for additional detail.

<sup>2</sup> Includes contributions from other sources (if applicable).

<sup>3</sup> Assumed equal to actual member contributions divided by 5.83%.

## Glossary of Terms

<b><i>Accrued Benefit Funding Ratio</i></b>	The ratio of assets to Current Benefit Obligations.
<b><i>Accrued Liability Funding Ratio</i></b>	The ratio of assets to Actuarial Accrued Liability.
<b><i>Actuarial Accrued Liability (AAL)</i></b>	The difference between the Actuarial Present Value of Future Benefits, and the Actuarial Present Value of Future Normal Costs.
<b><i>Actuarial Assumptions</i></b>	Assumptions about future plan experience that affect costs or liabilities, such as: mortality, withdrawal, disablement, and retirement; future increases in salary; future rates of investment earnings; future investment and administrative expenses; characteristics of members not specified in the data, such as marital status; characteristics of future members; future elections made by members; and other items.
<b><i>Actuarial Cost Method</i></b>	A procedure for allocating the Actuarial Present Value of Future Benefits between the Actuarial Present Value of future Normal Costs and the Actuarial Accrued Liability.
<b><i>Actuarial Equivalent</i></b>	Of equal Actuarial Present Value, determined as of a given date and based on a given set of Actuarial Assumptions.
<b><i>Actuarial Present Value (APV)</i></b>	The amount of funds required to provide a payment or series of payments in the future. It is determined by discounting the future payments with an assumed interest rate and with the assumed probability each payment will be made.
<b><i>Actuarial Present Value of Projected Benefits</i></b>	The Actuarial Present Value of amounts which are expected to be paid at various future times to active members, retired members, beneficiaries receiving benefits, and inactive, non-retired members entitled to either a refund or a future retirement benefit. Expressed another way, it is the value that would have to be invested on the valuation date so that the amount invested plus investment earnings would provide sufficient assets to pay all projected benefits and expenses when due.
<b><i>Actuarial Valuation</i></b>	The determination, as of a valuation date, of the Normal Cost, Actuarial Accrued Liability, Actuarial Value of Assets, and related Actuarial Present Values for a plan. An Actuarial Valuation for a governmental retirement system typically also includes calculations of items needed for compliance with GASB No. 25, such as the Funded Ratio and the Annual Required Contribution (ARC).
<b><i>Actuarial Value of Assets</i></b>	The value of the assets as of a given date, used by the actuary for valuation purposes. This may be the market or fair value of plan assets or a smoothed value in order to reduce the year-to-year volatility of calculated results, such as the funded ratio and the actuarially required contribution (ARC).

## Glossary of Terms (Continued)

<i>Amortization Method</i>	A method for determining the Amortization Payment. Under the Level Percentage of Pay method, the Amortization payment is one of a stream of increasing payments, whose Actuarial Present Value is equal to the UAAL. The stream of payments increases at the rate at which total covered payroll of all active members is assumed to increase.
<i>Amortization Payment</i>	That portion of the plan contribution or ARC which is designed to pay interest on and to amortize the Unfunded Actuarial Accrued Liability.
<i>Amortization Period</i>	The period used in calculating the Amortization Payment.
<i>Annual Required Contribution (ARC)</i>	The employer's periodic required contributions, expressed as a dollar amount or a percentage of covered plan compensation, determined under GASB No. 25. The ARC consists of the Employer Normal Cost and Amortization Payment.
<i>Augmentation</i>	Annual increases to deferred benefits.
<i>Closed Amortization Period</i>	A specific number of years that is reduced by one each year, and declines to zero with the passage of time. For example if the amortization period is initially set at 30 years, it is 29 years at the end of one year, 28 years at the end of two years, etc.
<i>Current Benefit Obligations</i>	The present value of benefits earned to the valuation date, based on current service and including future salary increases to retirement.
<i>Employer Normal Cost</i>	The portion of the Normal Cost to be paid by the employer. This is equal to the Normal Cost less expected member contributions.
<i>Expected Assets</i>	The present value of anticipated future contributions intended to fund benefits for current members.
<i>Experience Gain/Loss</i>	A measure of the difference between actual experience and that expected based upon a set of Actuarial Assumptions, during the period between two actuarial valuations. To the extent that actual experience differs from that assumed, Unfunded Actuarial Accrued Liabilities emerge which may be larger or smaller than projected. Gains are due to favorable experience, e.g., the assets earn more than projected, salaries do not increase as fast as assumed, members retire later than assumed, etc. Favorable experience means actual results produce actuarial liabilities not as large as projected by the actuarial assumptions. On the other hand, losses are the result of unfavorable experience, i.e., actual results that produce Unfunded Actuarial Accrued Liabilities which are larger than projected.

## Glossary of Terms (Concluded)

<b><i>GASB</i></b>	Governmental Accounting Standards Board.
<b><i>GASB No. 25 and GASB No. 27</i></b>	These are the governmental accounting standards that set the accounting rules for public retirement systems and the employers that sponsor or contribute to them. Statement No. 27 sets the accounting rules for the employers that sponsor or contribute to public retirement systems, while Statement No. 25 sets the rules for the systems themselves.
<b><i>GASB No. 50</i></b>	The accounting standard governing a state or local governmental employer's accounting for pensions.
<b><i>GASB No. 67 and GASB No. 68</i></b>	Statements No. 67 and No. 68, issued in June 2012, replace the requirements of Statements No. 25 and No. 27, respectively. Statement No. 68, effective for the fiscal year beginning July 1, 2014, sets the accounting rules for the employers that sponsor or contribute to public retirement systems, while Statement No. 67, effective for the fiscal year beginning July 1, 2013, sets the rules for the systems themselves. Accounting information prepared according to Statements No. 67 and No. 68 will be provided in a separate report.
<b><i>Normal Cost</i></b>	The annual cost assigned, under the Actuarial Cost Method, to the current plan year.
<b><i>Projected Benefit Funding Ratio</i></b>	The ratio of the sum of Actuarial Value of Assets and Expected Assets to the Actuarial Present Value of Projected Benefits.
<b><i>Unfunded Actuarial Accrued Liability</i></b>	The difference between the Actuarial Accrued Liability and Actuarial Value of Assets.
<b><i>Valuation Date</i></b>	The date as of which the Actuarial Present Value of Future Benefits are determined. The benefits expected to be paid in the future are discounted to this date.